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The Effects of Yoga on Occupational Therapy Students: A Pilot Study

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THE EFFECTS OF YOGA ON OCCUPATIONAL THERAPY STUDENTS: A PILOT STUDY

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CERTIFICATE OF APPROVAL

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Abstract

Recent literature reported the effects of yoga on both physical and mental health as beneficial. Research on these effects related to college occupational therapy students is limited. The purpose of this study was to examine the effectiveness of yoga on stress and anxiety levels within senior year and first year graduate occupational therapy college population. The current research was conducted to compare the effects of yoga in a convenience sample of 11 college students engaged in yoga classes or independent fitness experiences over an 8-week period at a comprehensive liberal arts college in the Northeast region of the United States. This author predicted that yoga would have a greater effect on stress symptoms over general physical exercise. The research design was a pretest/posttest design; stress scales and qualitative measures were administered. Data analysis of additional weekly stress scales showed that yoga had a positive effect during preparation for and decompressing from stressful situations throughout the eight-week period. The sample size of this study was small, limiting the generalizability to a greater population. Yet, this research aligns with previous reported literature in that yoga clearly has a positive impact in reducing stress levels and suggests academic curricula implement prolonged teachings of stress management techniques.

Table of Contents

Chapter 1: Introduction

Background

Yoga meditation (practice) techniques have been used to achieve relaxation for over 5,000 years. Yoga is a practice of connecting one's mind, body, and spirit. The definition of yoga means to yoke, or, union (Prabhavananda & Isherwood, 1987). According to Swatmarama (1987), in order to achieve happiness in everyday life, one needs to have a balance between the mind, body, and spirit. Mentally, the practice calms the mind and cultivates self-discipline as positive thinking is introduced. Physically, yoga helps to strengthen muscles while building balance and coordination, which promotes proper posture by aligning the spine. Spiritually, yoga encourages finding the special aim in life for each person, finding compassion for loving and understanding one's self and loving others (Fedosh, 2010).

To achieve the mind, body, and spirit connection yoga has to offer, this ancient practice involves connecting energy systems through the eight limbs of yoga; (I) abstinence from immoral behavior, or moral code (Yama), (II) observing mental and physical purity, or self discipline (Niyama), (III) posture, or poses (Asanas), (IV) breath control, or mindfulness of breathing (Pranayama), (V) withdrawal from sense objects, or detachment from senses (Pratyahara), (VI) concentration (Dharana), (VII) meditation, or positive and mindful focus on the present (Dyhana), and (VIII) higher consciousness, or ecstasy (Samadhi) (Pantanjali, 1975; Iyengar, 1965). However, the three main components (limbs) are, asana, pranayama, and dyhana. Asanas are poses and postures connecting the physical body with pranayama (breathing techniques), and dyhana,

(relaxation techniques) through mindfulness techniques, like meditation (Prabhayananda & Isherwood, 1987; Chugh-Gupta, Baldassarre, & Vrkljan, 2013).

In simpler terms, yoga is about happiness. For one to connect with lasting happiness, one must discover their truest self. In order to find ones truest self, the removal of mental obstructions is necessary; therefore, yoga is a meditation (physically and mentally) practice, a breathing exercise, a practice of self-observation, and a practice of letting go. Yoga is not about changing a person; rather, yoga gives the opportunity to reveal one's natural state of joy, love, compassion, and bliss by letting go of emotions and thoughts that are not truly part of ones self. By moving away from constant chatter and voices of self-doubt, the path to intuition of self and spirit is clearer. The practice of self-observation and being calm in difficult moments allows less judgment and forgiveness of others and of self.

Yoga as wellness and/or medicine in our heath care may facilitate health in many body structures. Yoga facilitates slower and deeper respiration, an increase in oxygen consumption, a reduction in blood pressure and heart rate, an increase in muscle tone and blood flow, and enhances flexibility while gaining muscle strength (Parshad, 2004; Chugh-Gupta et al., 2013). It has been suggested that yoga be used as an intervention by health care professionals, including occupational therapists, based on the benefits previously mentioned (Mailoo, 2005; Chugh-Gupta et al., 2013).

Occupational Therapy and Yoga

Occupational therapy helps individuals across the lifespan engage in occupations or activities that bring meaning to their life (AOTA, 2011). By encompassing a holistic approach towards healing, occupational therapy takes into consideration medical, psychological, and anthropologic backgrounds to maximize health and functional independence. Of the many occupational therapy models of practice, some proponents argue that medical approaches need to be met while addressing the emotional, intellectual, psychosocial, and spiritual aspects of the person. Such a model of practice is the Kawa Model (Iwama, 2006). The Kawa Model of practice seeks to give a visual narrative in which the client gives meaning to their past experiences, both positive and negative. This narrative may give an explanation and purpose to their current experiences, and most importantly assist in future planning. The Kawa Model uses a metaphor of a river to depict one's journey. Essentially, this model provides the student or client the tools to become their own therapist, recognizing barriers and resources that are standing in their way or could be helpful in order to enable, assist, restore, and maximize one's life flow (Iwama, 2006).

Similarly, both yoga and occupational therapy promote healthy awareness to body structures and function. Yoga is more than basic stretching as it encompasses many components to the body's physical reactions; among those are emotional, spiritual, and mental well-being. Occupational therapy brings purpose and meaning to everyday activities with awareness of body's movements in everyday activities while addressing mental clarity; a complete mind, body, and spiritual approach to occupations (AOTA, 2011). When occupational performance and engagement are interrupted, rehabilitation

and recovery are affected. Yoga has the potential to re-align the lost connection of mind, body, and spirit for positive outcomes in all roles of Occupational Therapy; as a student, a licensed therapist, and the client.

Occupational therapy programs are starting to incorporate mindfulness techniques into their curricula (Gura, 2010; Reid, 2013; Stew, 2011; Thompson, 2009). Techniques being taught are self-management skills, attitudinal changes, compassion for self-acceptance and for others, and an increased awareness to ones body. Reid (2013) suggests mindfulness curriculum be taught by web-based learning. Reid (2013) suggests this with the argument of easy accessibility, convenience, individualized learning, and pacing information.

Ideally, students will have learned these techniques before fieldwork and entering the professional field giving them an opportunity to use this knowledge for themselves and for their therapy practice in a client centered and holistic way early in their professional careers. Hartfiel, Havenhand, Khalsa, Clarke, and Krayer (2011) found yoga to be an effective tool in enhancing emotional well-being and resistance to stress. Their randomized control study of a short, once a week for 60-minutes during a 6 week intervention reports of improvements of clear-mindedness, composure, elation, energy and confidence.

Stress

Evidence reports stress may lead to increased depression, decreased job satisfaction, personal relationships suffer, psychological distress, and may even lead to suicide (Stew, 2011). Davidson (2003) demonstrated after only 8 weeks of mindfulness practice, positive changes in brain function and immune response occurred. Most

occupational therapy programs teach empathetic listening and how to establish meaningful relationships with clients. What might be lacking is a specific mindfulness curricula to employ these techniques for the students to use themselves in their role as a student, as a practitioner on fieldwork, and a licensed therapist to reduce the sense of burnout and emotional exhaustion associated with increased stress. Both cognitive and academic performances have been shown to improve following mindfulness training (Deckro et al., 2002); mental health and psychological wellbeing improves (Shapiro, Brown, & Biegel, 2007; Collard, Avny, & Boniwell, 2008), and the development of the person as a whole, also improves (Cohen-Katz, Wiley, Capuano, Baker, & Shapiro, 2005; Oman, Shapiro, Thoresen, Plante, & Flinters, 2008; Stew, 2011). In their study on the effect of yoga on academic performance in relation to stress, Kauts and Sharma, (2009) reported that students who practiced yoga performed better in academics and that the students stress level directly related to the students' performance.

Master of Occupational Therapy Programs

Master of Occupational Therapy students face high academic demands, reporting a decreased quality of life associated with changes in their habits and routines due to high academic vigor, creating an increase of stress and anxiety (Malek-Ismail & Krajnik, 2016).

The demands of the Occupational Therapy program are not hidden from prospective and current students. As described in the *Essential Functions for Occupational Therapy Education at a Northeast College (2015)* document, skill areas students need to be successful in the program. For example, "Students must possess the ability to adapt to the environment, cope with stressors, and assume daily

responsibilities" (pg. 2) and "Students must meet academic standards and possess critical thinking abilities sufficient for making sound judgments" (pg. 3).

For many students, this is a new way of learning and demonstrating their knowledge, ultimately requiring greater effort in both learning and exhibiting the material. In addition to their strong academic demands, students are also members of student-run committees, members of club and varsity sports teams, have part-time jobs, and partake in multiple occupational roles.

Rationale and Study Purpose

The American College Health Association (ACHA) provides important data including information reported to have influenced students' academic performance. Among the top negatively impacting identifiers was stress at 31.8%, anxiety, 23.2%, sleep difficulties, 20.7%, and depression, 15.4%; all of which have increased since 2013 from 28.5%, 19.7%, 19.4%, and 12.6% respectively (ACHA, 2013, 2016). The ACHA data supports that the demands of being a student are increasing and that stress negatively affects academic performance. With healthy stress management techniques, students may be more likely to feel successful in the classroom and in future careers. Employing stress management techniques, as researched by Agee, Danoff-Burg, and Grant (2009), may help when students who face stressful situations.

Stress can affect all college students. Many investigators reported that the particular stress involved with students enrolled in health science programs is greater than students not enrolled in a health science program (Mosley, Perrin, Neral, Dubbert, Grothues & Pinto, 1994; Stew, 2011). Students in health science programs are enrolled in intensive academic curricula and partake in patient care which, in turn, can create an

increase in their stress levels (Fares & Fares, 2016; Mosley, Perrin, Neral, Dubbert, Grothues, & Pinto, 1994).

Vinyasa yoga links breath and movement together flowing from one pose to the next with each inhale and exhale. The use of a "Vinyasa", a specific sequence of poses, links series of flows together throughout each yoga practice, allowing one to focus on their breath while moving. Proposal of participation in an eight-week, twice-weekly intervention of yoga, meditation, and mindfulness techniques might reduce stress, lessening their chance of anxiety or depression and increase their quality of life during a challenging semester.

It is believed that following completion of an eight-week yoga program; the participants may have an increased quality of life and better stress management skills by utilizing the tools of yoga, pranayama, and meditation when faced with current daily challenges.

The focus of this research was to examine how an in-person yoga practice intervention to include breath awareness and mindfulness training effects the perceived stress and anxiety levels in occupational therapy students by focusing a concerted effort on their awareness of thoughts, feelings, sensations, and compassion towards self and others.

Research Questions

The purpose of this study was to evaluate the effects of participating in an 8-week yoga intervention program for seniors and first year professional entry level master's students in an Occupational Therapy program at a private comprehensive Liberal Arts

college in the Northeast region of the United States. The following research questions were addressed. Following program completion:

1) Will students demonstrate a decrease in stress?
2) Will students be able to have a sense of resiliency (capacity to recovery quickly from difficulties) to address stressful life situations?
3) Will students be more likely to use yoga strategies as an intervention tool in their future OT practice?

Chapter 2: Review of Literature

Stress

As a growing public health concern, stress affects many individuals both physically and psychologically (Sohail & Rehman, 2015). The World Health Organization has coined “stress” as the 'Health Epidemic of the 21st Century' (Fink, 2016, p. 3). Stress is a reaction to the disruption of harmony or equilibrium between the many different systems in the body. Stress is one’s perception of internal and external situations that fall outside the individual’s capacity to cope (Myers, Sweeney, Popick, Wesley, Bordfeld, & Fingerhut, 2012). It is how one’s body responds to a challenge. Stress has a wide range of effects on one’s mood, emotions, and behaviors. Stress symptoms manifest differently in each person depending on their life experience, personality, physical conditioning, and genetics, which affect their health, physical, and emotional experiences in differing ways. What is known as 'acute stress' or, a little bit of stress can keep a person active and alert as adrenaline and cortisol hormones move through the body. However, long term stress, also known as 'chronic stress' may have detrimental effects on one’s health (American Psychological Association [APA], 2017).

The APA (2017) reports numbers of those affected negatively by stress continue to rise. More women report feeling stressed than men (37% women, 31% men, in 2015). Young adults, such as Millennial’s, born 1978-1998 (45%) report feeling more stressed than Baby Boomers, born 1946-1964 (25%). It is important to note that while the younger generations report feeling more stressed, they also report engaging more in stress relief activities but not doing enough to manage their stress. Overall, 77% of people in the United States who regularly experience physical symptoms (fatigue, headache, upset

stomach, muscle tension, change in appetite, teeth grinding, change in sex drive, and feeling dizzy) reported stress. Of those, 73% reported regularly experiencing psychological symptoms (irritability or anger, nervousness, lack of energy, feeling at any moment could cry) caused by stress (APA, American Institute of Stress, 2017).

Stress affects biological changes in the body by attacking physical and mental systems. These changes are due to the body moving into a 'fight or flight' response. In this type of response, the sympathetic nervous system produces a greater amount of cortisol and adrenaline to trigger an increased heart rate. The increased heart rate, body temperature, blood pressure, and respiration rates affect the body's organs, muscles, tissues, and blood vessels. In addition, metabolism, digestion, sleep, appetites, sexual drive, and fertility can also be affected by one's stress as the body sees these functions as non-essential while in a heightened state of arousal. Among the negative symptoms, stress becomes problematic when an individual becomes overwhelmed which can lead to greater health concerns including anxiety and depression, musculoskeletal disorders, chronic pain, high blood pressure, and heart disease (Anderzén-Carlsson, Persson Lundholm, Köhn, & Westerdahl, 2014). Additionally, unhealthy behaviors like smoking, poor dietary and sleep habits may occur as coping mechanisms for stress (Friedman, Sobel, Myers, Caudill, & Benson, 1995; Selye, 1956), leading to additional health risks.

Kim and Diamond (2002), in their seminal review "The stressed hippocampus, synaptic plasticity and lost memories," suggest stress has a three-component definition. First, stress requires a heightened arousal or excitability in either a behavioral, motor, or neurochemical (adrenaline/cortisol) levels. Then the experience must also be viewed as aversive. Lastly, there is a lack of feeling in control. According to these investigators

and Fink (2016), the amount of stress can be calculated by this equation: Stress = Excitability/arousal (E) x Perceived aversiveness (A) x Uncontrollability (U), or (S) = *E* x *A* x *U*.

Often when the body is under the stress response, cognition, emotion, and destructive behaviors are seen to be more reactionary, and include negative appraisal (Chrousos & Gold, 1992). When the body systems are not working in harmony, mental clarity can also be affected, creating a negative feedback loop which increases the risk for inflammatory responses of dysfunction and disease elicited by the sympathetic nervous system (Kiecolt-Glaser, McGuire, Robles, & Glaser, 2002). Additionally, research on chronic stress indicates an increase risk of developing high blood pressure, anxiety, insomnia, coronary heart disease, other infectious diseases, and negatively effects the immune system (Lagraauw, Kuiper, & Bot, 2015).

Cohen, Kamarck, and Mermelstein (1983) describe when one is stressed, adrenal glands release elevated amounts of cortisol levels. The body's cognitive and physical functions are confronted with the excessive amounts of cortisol levels in an unproductive manner. Excess cortisol can prevent ones metabolic responses, which affect blood glucose levels. In turn, the blood glucose levels create fat and typical immune responses to include detection of inflammation responses are suppressed and blocked. Without the typical immune responses, the body becomes more susceptible to disease. Memory can also be affected by stress; the hippocampus has many cortisol receptors and is the site where certain types of memories are formed in the brain (Lundy-Ekman, 2013). When excessive amounts of cortisol are released, the hippocampus is unable to keep pace and memory is affected (Randall, 2010). From a college student's perspective, if one is

stressed, memory is affected and a stress ripple effect occurs; the student is unable to retain and recall important information for exams and practical's due to hippocampus insufficiency, which in turn creates more stress about grades and their success in the program. A negative cycle ensues.

Stew (2011) and Balogun, Titiloye, Balagun, Oyeyemi, and Katz (2002) also recognize stress can lead to mental setbacks such as an increase of depression, decrease in job satisfaction leading to burnout, personal relationships may suffer, one may have psychological distress, and even suicidal thoughts or tendencies may arise. The lack of capacity to cope with stress may lead to one of the numerous possible negative effects mentioned previously and the high percentage of people who recognize with being stressed has been a growing concern for years. Therefore, improved stress management techniques and skills are suggested to help alleviate the possible detrimental effects one might face when stressed in both the short and long term.

Anxiety

When not dealt with effectively, "Stress leads to a feeling of fear and anxiety" (Fink, 2016, p. 5). Anxiety, according to the *Diagnostic and Statistical Manual, 5th Edition* (DSM-V) (APA, 2013), is a future-oriented mood state associated with preparation for possible, upcoming negative events. One article describes anxiety to be a vague, uncomfortable feeling exacerbated by prolonged stress and the presence of multiple stressors (Lazarus & Folkman, 1984; Craske, Rauch, Ursano, Prenoveau, Pine, & Zinbarg, 2009). Similar to stress, small amounts of anxiety can have positive influences on daily occupations by increasing efficiency; however, high levels of anxiety interfere and can be detrimental to occupations (Bamber & Kraenzle Schneide, 2016).

Similar to stress, anxiety can affect both mental and physical health. The DSM-V subdivides anxiety into multiple subtypes; however, all definitions focus on a fear or worry for a prolonged amount of time, typically more than six months. Often pharmacotherapy (use of pharmaceuticals) and psychotherapy (cognitive-behavioral therapy [CBT], cognitive therapy, and applied relaxation) are used as treatment options; however, more research is being conducted noting the benefits utility for treating anxiety disorders (Keller, 2017).

Of the various types of anxiety, State and Trait anxiety are often defined. State anxiety is "the emotional state of an individual response to a particular situation or moment." Trait anxiety is "the tendency of an individual to respond to stress with state anxiety" (Moscaritolo, 2009, p. 18; Turner & McCarthy, 2017, p. 22). For research purposes, the State Trait Anxiety Index for Adults (STAI) (Spielberger, 1989) measure is used to determine state and trait anxiety levels of participants. The STAI (Spielberger, 1989) has 40-items on a 4-point scale from *0* (Not At All) to *4* (Very Much So) used to assess, diagnose, and separate state anxiety and trait anxiety, feelings of anxiety and feelings of depression. How one currently feels, and how they usually feel. Higher scores indicate greater anxiety levels. There is large evidence for the construct and concurrent validity of this scale (Spielberger, 1989).

Stress and Anxiety in College Students

Mental health in college students continues to be a focus of research as percentages rise year to year for stress and anxiety. Reports from the 2016 American College Health Association (ACHA) executive summary reported 86% of students felt overwhelmed by all they had to do within the previous 12 months. In the same report,

60.8% of students reported feeling overwhelming anxiety, and 50.9% reported feeling 'hopeless' in the previous 12 months. The research indicates a need to change the way universities and college programs help to address stress and anxiety in students.

Both stress and anxiety negatively affect the many skills needed to be a successful student, including, but not limited to: memory, concentration, and problem solving. Dampening these skills can lead to illness, rumination, avoidance, and or depression (Beddoe & Murphy, 2004; Kang, Choi, & Ryu, 2009). Students report test taking is one of the most anxiety provoking events. In addition, receiving poor test scores often results in high anxiety, and students with low grades are more likely to report high anxiety (Godbey & Courage, 1994).

University and college allied health science programs are known to have intensive academic curricula that are demanding and difficult for many students. College students have reported much of their stress comes from the belief that they do not have enough time to complete assignments. They also report feeling they do not have the knowledge required to pass courses (Misra, McKean, West, & Russo, 2000). According to the ACHA, stress, anxiety, and depression are among the top four negative impacts on students' success in the classroom (ACHA, 2016). In addition to the traditional demanding curriculum, students in allied health programs are simultaneously partaking in patient care for the first time. Interacting with patients, developing, implementing and documenting care in the early stages of a students' career is often anxiety provoking. (Malathi, & Damodaran, 1999; Mosley et al., 1994; O'Meara, Kostas, Markland, & Previty, 1994; Rizzolo et al., 2009).

Rowe (2006) recognizes that many students are able to cope with small amounts of acute stress and that when under pressure some students are even more productive. While true for some, it is not the case for the majority of college students. It has been recommended that formal education program providers, especially those in the health science fields, lay a foundation for students to learn healthy behaviors and coping strategies to manage their stress early in their academic career (Stew, 2011; Wolf & Kissling, 1984; Rowe, 2006).

Rowe (2006) further suggests that stress begins during the educational process and continues through one's professional career. Consequences from the loss of sleep and poor physical health due to stress and anxiety compromise concentration, productivity, and time management habits and routines that are easily rolled from student life to professional life (Hunt & Eisenberg, 2010). Therefore, it is important for programs to teach their students how to identify and cope with stress as a means to develop positive coping strategies prior to becoming entry-level professionals.

Among the few studies of stress on occupational therapy students, Tyrell and Smith (1996) reported that, when comparing age equivalent adults to students in an occupational therapy program in Ireland, students in the occupational therapy program had higher levels of psychological stress on the General Health Questionairre-28 (Goldberg, 1978), 43% compared to 5% respectively. The occupational therapy students from this study attributed their increased stress levels to long hours of studying, lack of free time, the amount of class work assigned and expected, and the clinical rotations they already completed or were anticipating in the upcoming months. In general, students stress can be attributed to occupational imbalance. This status is opposite of having

occupational balance; that of a balanced rhythm between work, play, rest, and sleep (Matuska & Barrett, 2014). An imbalance refers to a perception that one's patterns of everyday occupations are unsatisfactory and include too many or too few meaningful occupations. Developmentally, students are typically transitioning from a routine developed over 18 years to living independently or with classmates as adults. Many students are having independent accountability of their finances, nutrition, sleep habits, peer groups, and have more exposure to drugs and alcohol. The combination of school pressure and developmental states is a formula ripe for chronic stress.

Coping Strategies Among College Students with Stress and/or Anxiety

Negative consequences occur when students are not taught how to cope with their stress (ACHA, 2016). Stress management at the beginning of one's academic career has the potential to decrease the risk of academic decline, poor relationships with peers and family members, and overall dissatisfaction with life (Linn & Zeppa, 1984). After graduation, students with established stress management skills have the tools needed to cope with the physiological and psychological effects of stress when entering the professional field (Rizzolo et al., 2009).

Coping strategies are those used to change cognitive and behavioral efforts when faced with exceeding internal or external demand(s) (Marquez-Arrico, Benaiges & Adan, 2015). Di Pierro (2017) notes that stress, especially in graduate school, is not going to magically disappear from academia, rather, educators need to be more mindful of the existential challenges students face while also tackling challenging curricula. The author suggested educators recognize and work in a compassionate and collaborative way to support the students to help neutralize the negative effects of stress and anxiety among

college students. She also notes that 70% of the graduate students who participated in the study reported having mental health barriers affecting their academic performance, but would not confide in faculty members; rather, students would tackle the difficulties by themselves.

Eisenberg, Golberstein, & Gollust (2007), reported many college students do not seek help on campus for two main reasons; lack of time, and the negative stigma attached to seeking counseling help. Kitzrow (2003) notes that those students who do seek help from campus health clinics are often put on long wait lists for services. Services on campuses are not currently meeting student needs.

Two common and unhealthy coping strategies to manage stress among college students is abuse and illegal use of drugs and alcohol. Deatherage, Servaty-Seib, and Aksoz (2014) researched college students' stress, coping, and Internet use and how these variables interacted. They used the 10-question Perceived Stress Scale (PSS) and found women had significantly higher rates in perceived stress scores compared to men in the same study. In a professional program such as occupational therapy, where 88% of students are women (AOTA, 2015b), a one might postulate that healthy stress management techniques would need to be implemented by program standards and the faculty.

Gorvine (2016) looked at the effects of yoga on self-perceived stress, self-compassion, and mindfulness in college students. Gorvine's findings do not statistically show significant changes but did reveal that stress levels lowered, and self-compassion and mindfulness increased. A limitation to her study is the small sample size (N=30) and use of hypothesis testing over the use of an analysis targeted more towards smaller

sample sizes. Additionally, the research participants were only questioned twice, at week 2 and 11, using the 10-question version of the Self-Perceived Stress Scale (PSS-10; Cohen & Williamson, 1988) rather than targeting data-collection during important times throughout the semester, such as mid-term and final examinations.

Interventions for Stress and Anxiety for College Students

Internet-based interventions.

Stress is common among America's college campuses and is not something that is likely to go away. One healthy option for college students is to seek help for stress and anxiety via online resources and internet-based interventions (Hintz, Frazier, & Meredith, 2015). With these online resources, students are not susceptible to the perceived stigma attached to counseling, it is less expensive, does not require students to travel, and can be more time sensitive (Amstadter, Broman-Fulks, Zinzow, Ruggiero, & Cercone, 2009).

Mindfulness-training interventions.

Another healthy intervention option found to be successful for college students is mindfulness training. Mindfulness training has been defined by Kabat-Zinn (2006) as "the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment" (p. 145). Stew, (2011) recognizes the discipline of participating in interventions to reduce stress is difficult. Finding the time for self care and mindfulness with the vast to-do lists, readings, assignments, and exams is overwhelming. In Stew's (2011) study of mindfulness training for occupational therapy students, students recognized the importance of moving away from their busy schedule of 'doing' and into a space that mentally allowed for a connection to their inner self. Students in this study remarked on

how “they are not their thoughts, feelings, or sensations,” instead, they found space for self-care in their work as a student and in their day-to-day lives (p. 272).

Research has shown the benefits of mindfulness training. Mindfulness interventions have demonstrated improvements in cognitive and academic performance (Deckro et al., 2002), mental health with the reduction of anxiety (Shapiro et al., 2007; Shapiro, Schwartz, & Bonner, 1998), and reduced stress in the short term (Chiesa & Serretti, 2009). Overall, college students show reduced stress when engaging in mindfulness-based interventions as studied in a meta-analytic review of research literature (Regehr, Glancy, & Pitts, 2013).

In a review of 57 articles, Bamber and Kraenzle Schneider (2016) examined the effects of mindfulness meditation on stress and anxiety in college students. They found “mindfulness meditation shows promise in reducing stress and anxiety in college students (p. 1)." They also proposed mindfulness-based interventions to be used in program orientations, or at the start of each course to potentially increase the success of the students and improve academic achievement by reducing stress and anxiety. In another study, investigators recognized the importance of mindful meditation, where restful reflection and awareness had demonstrated to help reduce stress (Narasimha Reedy & Ammani, 2013). Lane, Pieper, and Seskevich (2007) reported in a study of 200 individuals (students, staff, faculty, and visitors) from a university setting, that the more frequent one practiced meditation, the better the outcome for the prevention, management, and treatment of stress.

Stress negatively impacts body functions and structures of the body. Meditation has been found to reduce these adverse effects of stress if practiced before said stressful

event (Mohan, Sharma, & Bijlani, 2011). In this study, the investigators found a decrease in heart rate and cortisol levels after meditation. Medical schools have also found success by providing their students mindfulness meditation as an effective coping strategy for stress and anxiety for not only themselves, but also for future clinical context (Phillips, 2015).

Physical exercise interventions on physical and mental health.

Research regarding the positive effects of physical fitness on mental heath is bountiful; management of weight, weight loss, reduced risk of cardiovascular disease and some cancers, strengthened bones and muscles, improved chances for living longer, and improved mood (Center for Disease Control [CDC], 2015). For many, initiating a physical activity routine seems intimidating and just one more activity to add to the 'to-do' list, especially to overwhelmed college students. While exercise programs continue to be advertised for their healthy lifestyle benefits, nearly 50% of adults in the U.S. fail to participate in the recommended amounts of physical exercise (Hegberg & Tone, 2015). The Center for Disease Control (CDC) (2015) recommended individuals participate in at least 10 minutes of moderate exercise (walking or running) per day. The National Institute for Mental Health (NIMH) also recommended physical exercise for optimal health (Milligan, 2006).

Many students understand and know the benefits of physical exercise but, once again, they also know their coursework requirements, their 'to-do' lists, and exam schedules. Finding 10 minutes in a day for personal self-care can seem daunting. Engagement in regular exercise helps to buffer the negative impact stress has on physical and mental health (Zschucke, Renneberg, Dimeo, Wüstenberg, & Ströhle, 2015).

Similarly, exercise helps to enhance ones psychological well-being, with positive effects on depression causing symptoms (Hassmén, Koivula, & Uutela, 2000).

In a survey of 814 college students at three different southern California colleges, Nguyen-Michel, Unger, Hamilton, and Spruijt-Metz (2006) acknowledge physical activity may be a viable mean of reducing stress, but may not produce a large change in stress. They suggest, the type of exercise matters when targeting stress reduction. In addition to physical movement, a mindful-based practice may yield a greater change in stress reduction. Research completed by Caldwell, Harrison, Adams, Quin, and Greeson (2010) of 166 college students over a 15-week course concludes movement-based courses like, Pilates, Taiji quan, or Gyokinesis can help to increase mindfulness. With increased mindfulness, changes in perceived stress and mood are positively impacted. Therefore, both physical and mental exercise is recommended for optimal health.

Transcendental meditation.

Transcendental Meditation (TM) is one of the oldest forms of meditation dating back 5,000 years. This form of meditation uses a mantra-based technique of repeating a sound for 15-20 minutes twice a day. TM is sometimes confused as a religious act; however, it is solely the practice of being mindful in a quiet and restful state. Burns, Lee, and Brown (2011) make the argument TM can be incorporated in the life-style of college students because one can practice TM almost anywhere and at anytime. The literature suggests TM is effective in combating mental health concerns among university and college students and therefore should be considered among counseling centers as a preventative tool towards decreasing the negative and debilitating consequences of stress and anxiety.

While meditation is not a formal method of therapy, evidence suggests meditation-based activities can effectively reduce stress (Goyal et al., 2016). The effectiveness of TM in reducing depression, stress, anxiety, and improving academic performance and school behavior has been studied and published in scientific journals over 700 times since the 1970s (Brooks & Scarano, 1985; Ferguson & Gowan, 2016; Van den Berg & Mulder, 1976; Dillbeck, 1977; Eppley, Abrams, & Shear, 1989; Sheppard, Staggers, & John, 2007; Dillbeck & Orme-Johnson, 1987; Barnes, Bauza, & Treiber, 2003; Kember, 1985). In 2009, Tanner and associates (2009) found at the conclusion of a 3 month randomized controlled study with college students using TM, that the meditators had a significant increase in mindfulness skills, were more open to experiences, had heightened self-compassion, and increased emotional intelligence as well as the ability to identify and manage ones own emotions and the emotions of others (Burns et al., 2011).

Yoga

Yoga asanas are poses and postures connecting the physical body with pranayama (breathing techniques), and dyhana, (relaxation techniques) through mindfulness techniques, like meditation (Prabhayananda & Isherwood, 1987; Chugh-Gupta et al., 2013). The practice of yoga allows one to stay present, to relax, and to slow down. Yoga helps the breath, as respiration become slower and deeper; therefore, one has an increase in oxygen consumption. Additionally, blood pressure and heart rates are slowed and an increase in muscle tone and blood flow has been reported (Parshad, 2004). There is a shift from the sympathetic nervous system's flight-or fight response to a rest and digest or relaxation response of the parasympathetic nervous system (McCall, 2007).

The National Institutes of Health states yoga as a growingly popular physical exercise discipline as a “'meditative movement practice” ' (National Center for Complementary and Integrative Health [NCCIH}, 2016, first paragraph). Research on yoga interventions on the aspects of stress reduction is broad because there are many different styles of yoga, and of yoga instructor’s training and personality. One size or style of yoga does not fit all; the yoga student has the ability to find the style of practice that best fits their personality.

Recently, the National Health Interview Survey (NHIS, 2016) found there has been a significant rise of U.S. adults practicing yoga: 5.1% in 2002 to 9.5% (21 million) in 2012. The physical practice of yoga helps to improve joint mobility and muscle flexibility, and is also an aerobic exercise making the heart beat faster while increasing the conscious breath (Monica, Cristina-Elena, & Mihaela, 2015; National Heart, Lung and Blood Institute, 2016). In addition to these physical benefits, the yoga practice interlaces mindfulness training which provides mental health benefits such as a decrease in stress and tension and an increase in memory and cognition (Novotney, 2009).

Most people who practice yoga, practice an overarching style called Hatha Yoga. Hatha Yoga helps to train the body and mind to improve balance in the aspects of physical, emotional, and spiritual health (Feuerstein, 1996; Uebelacker et al., 2010). Literature suggests Hatha Yoga has provided benefits in executive functioning (Gothe, Kramer, & McAuley, 2014), improving mindfulness, and significantly lowering stress levels (Brisbon & Lowery, 2011). Under the umbrella of Hatha Yoga includes differing styles of yoga, among those, a few are: Ashtanga, Iyengar, Bikram, Kripalu, Kundalini, Yin, and Vinyasa. Each style varies the emphasis of breath, physical, and spiritual focus.

For example, Ashtanga yoga is a set series of six established pose sequences, where yoga practitioners advance in the series as progress is made. Iyengar yoga focuses on precise and proper alignment of the body using props to best align the body in each pose. Yin yoga lengthens the hold of each pose to best stretch and lengthen connective tissues and the breath. All styles of Hatha Yoga allow for the practice of patience, to be present, and relax into the body and mind.

Yoga, Stress, and Anxiety

When evaluating yoga as an intervention tool, investigations on the effectiveness of yoga on stress and anxiety will be described. Each study tends to utilize differing styles of Hatha Yoga, lengths of study, and intervention techniques. At a minimum, research supports at least a once-weekly yoga practice for mental health benefits (Cowen & Adams, 2005; Harkess, Delfabbro, Mortimer, Hannaford, & Cohen-Woods, 2017; Michalsen, Grossman, Acil, & Dobos, 2005; Michalsen et al., 2012).

Yoga can be seen as a desirable intervention for those suffering from mental health negativities as yoga promotes healthy behaviors both mentally and physically. Yoga is called a practice and therefore it is not interested in 'fixing' rather allowing one to focus on living their life to their fullest potential. The practice of yoga has been documented as a way to cope with depression (Weintraub, 2004). Yoga teaches individuals to become aware of cognitive thoughts that arise during the practice and develop ways of reframing negative cognitions (thoughts, beliefs, feelings). When a yoga practice concludes, yogis are encouraged to take the meta-awareness and self-regulation learned in their practice off the yoga mat and into their daily lives. Self-regulation is the use of monitoring and motivation to manage one’s immediate response

or impulse to maintain positive progress towards set goals and standards (Gard, Noggle, Park, Vago, & Wilson, 2014). Cope (1999) recognizes that yoga in an effective way for people to obtain insight into their lives.

In Keller's (2017) systematic review of scientific evidence, investigating yoga as a treatment for anxiety, found three randomized control trials reporting a yoga intervention resulted in statistically significant decreases in stress scores and lower anxiety compared to those with medication. One study in particular indicted that yoga alone was an effective anti-anxiety treatment (Doria, de Vuono, Sanlorenzo, Irtelli, & Mencacci, 2015) A study by Smith, Hancock, Blake-Mortimer, and Eckert, (2007) reported yoga was effective at the reduction of stress and anxiety, and that yoga had positive outcomes when improving mental health. In another study on the effect of yoga on anxiety and subjective well-being of older adults, Bhosale (2016) reported a significant decrease in anxiety and a positive change in the subject's subjective well-being. Her study is one of the many indicating positive effects of a yoga practice intervention to improve the connection between the mind and the body.

Harkess and colleagues (2017) conducted a two-month clinical trial with women who experience chronic stress were either in the experimental group allowing twice-weekly, hour-long yoga classes, or part of the waitlist-control group. These investagtors found psychological distress decreased greater in the yoga control group indicating the yoga intervention yielded benefits.

In *A life worth breathing: A yoga master's handbook of strength, grace, and healing,* Strom (2012) noted that when practiced correctly, yoga requires a fair amount of focus. The focus cultivated through yoga and breath work is easily translatable to ones

daily life. When one takes time, intention, and attention, one can become less reactionary and more present while moving through situations with more gratitude and self-empowerment.

Udupa, Singh, and Dwivedi (1977) documented that yoga has the potential to influence the stress response by helping the individual achieve physical and metabolic stability. Sahasi, Mohan, & Kacker (1989) mentioned a report of increased attention and concentration in the management of anxiety with yoga techniques. One of these techniques being pranayama (breath regulation), through the use of pranayama, the hippocampus, hypothalamus, amygdala, and stria terminalis activate and thereby improve the feedback mechanisms associated with neuroendocrine release (i.e., cortisol), emotional processing, and social bonding (Brown & Gerbarg, 2005; Jerath, Edry, Barnes, & Jerath, 2006; Telles, Singh, Bhardwaj, Kumar, & Balkrishna, 2013). In summary, the use of pranayama breath regulation may help students manage anxiety by improving their attention and concentration; a beneficial skill to utilize when studying and managing daily routines.

Yoga & College Students

In 2012, Nowak and Hale reported college students had a strong interest in yoga. Riley, Park, Marks, and Braun (2012) noted in their survey that more than half of undergraduate students had tried yoga. As the literature suggests, retention of the yoga practice, even for short periods of time, is important in obtaining the mental and physical benefits a yoga practice can provide. Routine is difficult to create in a college setting with class schedules differ each day of the week, extra circular obligations, part-time jobs, social events, etc., leaving campus to attend a yoga studio is not only time

consuming, but also expensive. College campuses do offer yoga classes at recreation centers; however, many are only offered a few times a week, with capacity limitations, and are often taught by fellow students who may not have the skills and knowledge. To combat the road blocks for students to have access to the benefits of yoga, Kauts and Sharma (2009) utilized a yoga module be implemented as a regular feature in the college curriculum for the management of stress as academic performance; the participants in their study improved.

Narasimha Reddy and Ammani (2013) looked at different stress factors in university students in a professional program as it relates to yoga and meditation offered to their students. The pre-post test factors considered in their study were role overload, role ambiguity, role conflict, unreasonable group, political pressures, frustration, under pressure for exams, competition in class, poor peer relations, financial burdens, scholarship requirements, family related pressures, and course-related pressures. The researchers concluded that yoga and meditation had a significant impact on the stress factors mentioned above. They recommended yoga and meditation be provided regularly by university programs for the reduction of stress in students.

Villate (2015) conducted a study over the course of three college length semesters with 60 students. The students met twice weekly for 75 minutes for school credit, they were taught the history of yoga, concepts of yoga, styles of yoga, and were led in a 60-minute practice each meeting. Her research was based on students' written responses to reflective questions. She found common themes among the students' responses: being more calm, having greater perspective and focus, and the feeling of being empowered.

One student reflected on the calming affect of yoga and how it impacted their stress levels:

> "After yoga practices, I feel extremely calm and at peace with everything. Even for the rest of the day I find myself breathing deeper and feeling more calm, rather than stressed as usual, and that is the biggest way it has impacted my life." (p. 53)

Another student commented on being very stressed and having horrible sleep patterns at the beginning of the semester. By the conclusion of the yoga class, the student realized stressors still existed but knew, with acknowledgment of the breath and what was actually causing stress, to be able to work towards letting things go. Yoga helped the students to realize there is no need to worry about things they do not have control over, to take a few breaths, and come back to what is happening in the present moment. This study is important as common themes were found among three different class cohorts at semesters length. One limitation in her results is the lack of standardized measures and the reliance on self-reporting for a portion of class grade.

Kauts and Sharma (2009) studied the effect of yoga on academic performance in relation to stress and reported that students who practiced yoga were able to focus more clearly. Recognizing their yoga practice provided an increased focus in daily life allowed for carry-over into their classes and studying. They performed better in academics and concluded that their stress level directly related to the academic performance. Perceived stress and test anxiety have also been reported to reduce in undergraduate and graduate students respectively with the use of pranayama instruction (Sharma, Trakroo, Subramaniam, Rajajeyakumar, & Bhavanani, 2013; Nemati, 2013).

Rowe (2006) notes the importance of teaching and implementing stress management skills and techniques to reduce debilitating symptoms of stress. The literature continues to demonstrate yoga as being a helpful tool in the management and reduction of stress.

Occupational Therapy

To better understand occupational therapy, the term *occupation* must be defined. *Occupation*, as defined by the American Occupational Therapy Association (AOTA), is any daily life activity that is meaningful, valuable, or satisfying to an individual, group, or population (AOTA, 2014). Occupations consist of activities of daily living (ADLs), instrumental activities of daily living (IADLs), rest and sleep, education, work, play, leisure, and social participation (AOTA, 2014). These occupations are different for each person as they depend on the individual client factors, their performance skills, and performance patterns that occur in unique contexts and environments (AOTA, 2014). Occupational therapy promotes techniques to enhance active engagement, participation, performance, and function in meaningful roles, habits, and routines in various life settings for clients. Participation is enhanced with client-centered and occupation-based interventions (AOTA, 2014).

Occupational therapy, defined by AOTA means:

> The therapeutic use of occupations, including everyday life activities with individuals, groups, populations, or organizations to support participation, performance, and function in roles and situations in home, school, workplace, community, and other settings. Occupational therapy services are provided for habilitation, rehabilitation, and the promotion of health and wellness to those who

> have or are at risk for developing an illness, injury, disease, disorder, condition, impairment, disability, activity limitation, or participation restriction. Occupational therapy addresses the physical, cognitive, psychosocial, sensory-perceptual, and other aspects of performance in a variety of contexts and environments to support engagement in occupations that affect physical and mental health, well-being, and quality of life (AOTA, 2011, p. 1).

The *Occupational Therapy Practice Framework: Domain and Process,* 3rd ed., (Framework-III, AOTA, 2014) (OTPF) summarizes occupational therapy's unique approach to health care. Occupational therapy focuses on achieving health, well-being, and participation through the use of occupation. One way is for occupational therapists to promote health by teaching strategies to better incorporate healthy habits and routines into daily activities. Occupational therapists identify solutions to any barriers that the person, their environment, and the occupation might present. They also provide education about the importance of rest and relaxation to achieve balance between occupations (i.e., work and leisure); they teach relaxation techniques. The work-life balance is important to daily functioning; occupational therapists provide skills training in time and stress management to obtain this ever so important balance.

Both AOTA's (2011) definition of occupational therapy and the *Framework-III* (AOTA, 2014) spell out how occupational therapists are able to collaborate with the client to find the best balance in health and well-being through the use of meaningful occupations.

Occupational Therapy Students

The shift into professional health care education curricula has been reported to lead to a greater imbalance of occupations, roles, patters, and routines (Malek-Ismail & Krajnik, 2016). For occupational therapy students, academic requirements change to a more abstract thinking using research, clinical reasoning skills and a greater emphasis on theory. In a study of Master of Occupational Therapy (MOT) students, Pfeifer, Kranz, & Scoggin (2008) found 67% rated their stress at 'above average' to 'highest in my life.' When clinical reasoning skills, concepts, theory, and research were required to be used, these same students reported additional stress (Malek-Ismail & Krajnik, 2016).

Malek-Ismail and Krajnik (2016) summarized from their phenomenological study on the perceptions of entry-level MOT students that there is a need to better understand and help these students manage stress. These researchers recognized the importance of occupational balance for occupational therapy students. It is also in the core beliefs of occupational therapy to support a healthy balance of meaningful occupations, especially as students because the students enrolled today are tomorrow's therapists and clinicians.

Based on the Accreditation Council for Occupational Therapy Education (ACOTE) (AOTA, 2011) Standards, occupational therapy students receive a strong educational knowledge and gain valuable skills for practice. Given the intensity of the ACOTE standards, academic programs find it difficult to insert additional knowledge into their course calendar and syllabus that may be beneficial to their students' personal and professional mental and physical health. Despite the tight semester length timeline, some occupational therapy programs are starting to incorporate mindfulness techniques into their curricula where students saw the benefits of this application, but needed structure to

apply the mindfulness to their daily stressors (Gura, 2010; Reid, 2013; Stew, 2011; Thompson, 2009).

Occupational Therapy Theory – Kawa Model

While there are many models of practice an occupational therapist can choose; the Kawa Model fits well with the practice of yoga. The Kawa Model (Iwama, 2006) is a theory used by occupational therapists, as it is culturally relevant to all lifestyles. This model uses the metaphor of a river to portray life flow and barriers that might block this flow. Within this flexible model of practice, an occupational therapist has the role of positioning oneself at the side of the river to assist the client in breaking down barriers to better their life. The river represents the client's life from birth to death. The water represents life flow, rocks are life circumstances and problems, driftwoods are personal factors (strengths/weaknesses/assets/liabilities), and riverbeds and walls represent the physical and social environments. The spaces in between the barriers represent where the client still has life flow and it is in that space where opportunity lie for intervention as the occupational therapist and client work colaboratively.

Both the Kawa Model and the practice of yoga encourage reflection. With reflection, one is able to create a connection with the relationships had with physical and social environments. In this model, Iwama (2006) underlines that water is essential for life, that it is "pure and rejuvenating" (pg. 141). Like water, breath is essential for life; in a yoga practice, breath becomes acknowledged with each inhalation and exhalation. The acknowledgement of breath allows one to be present, which in turn, allows for non-judgment of the barriers, and opportunity to open areas for the metaphorical water and for the breath to flow.

When relating both the Kawa Model and yoga to stress, identification of barriers allows for optimal state of well-being. The Kawa Model recognizes that wherever the client identifies as an area in their life where water flow can be increased, is where therapy potential exists. The metaphor of water flow potential is similar to one's breath as it relates to yoga. Where there is room for breath, there is room for expansion of the pose, more attention to the body, and greater acceptance with the present and of self. Utilizing The Kawa Model and yoga techniques (i.e., deep breathing), can help to break down the limitations, barriers, and the impact stress can create on physical and social environments. The deep breath and identification of an increased flow of water can lead to an enhanced life flow. "Intervention may not necessarily focus on unilateral purposeful actions but rather support the client to cope and adapt to a constellation of factors interfacing and constructing that person's problems" (Iwama, 2006, p. 141).

Furthermore, the Kawa Model and yoga are tools used to gain understanding. The occupational therapist using the Kawa Model to guide their practice is not trying to fix the client. Instead, the occupational therapist is there to introduce (if needed) support, and facilitate the client's life flow with adaptations that are relevant and meaningful to the client. Similar to the Kawa Model, yoga is not about fixing, it is about opening and expanding areas in the body and mind for reflection and shedding layers no longer serving the person practicing yoga.

Complimentary Health Approaches and Integrative Health in Occupational Therapy

The previously recognized term *complementary and alternative medicine (CAM*) has been replaced with *complimentary health approaches* and *integrative health*. These

are terms used by the National Center for Complementary and Integrative Health (NCCIH) with efforts in incorporating these approaches into traditional western health care (AOTA, 2016 & NCCIH, 2016a). AOTA recognizes the use of yoga as one of the numerous complementary health approaches and integrative health (CHAIH) when used responsibly by a competent occupational therapist. The competent therapist is able to use yoga techniques as a way to prepare or to enhance participation and engagement in occupations (AOTA, 2016).

CHAIH approaches are often used to prevent or reduce symptoms of clinical conditions that may inhibit their participation in daily occupations, habits, and routines. In addition, these practices may help deepen their sense of well-being and be part of their daily occupations, habit and routines (AOTA, 2016; Carlson & Krahn, 2006; Ho, Rowland-Seymour, Frankel, Li, & Mao, 2014; Okoro, Zhao, Li, & Balluz, 2013; Purohit, Wells, Zafonte, Davis, & Phillips, 2013). AOTA's (2016) CHAIH position paper acknowledges the use of yoga in an occupational therapy plan of care to support and engage a client in their meaningful occupations. For example, yoga can be used as preparatory method to assist in stress reduction before ADL using deep breathing techniques, mindfulness methods in occupations, and demonstrating strength and standing balance when participating as an activity. To be client-centered, these methods, should only be used when considering the client, their values, and beliefs (Mroz, Pitonyak, Fogelberg, & Leland, 2015).

To encourage the use of safe and effective yoga approaches, AOTA's *Occupational Therapy Code of Ethics* (AOTA, 2015a) holds the practitioner accountable to practice within their personal level of competence. Unlike some CHAIH approaches

(acupuncture and Asian medicine, chiropractic, massage therapy, direct-entry midwifery, and naturopathic medicines) that require state and federal licensure, no specific guidelines are in place for occupational therapists to incorporate yoga in their plan of care (AOTA, 2015b). Occupational therapists who choose to use yoga as a preparatory method, task, occupation, or activity, are responsible for the development and maintenance of adequate training in order to provide these services (AOTA, 2015b; 2016).

Occupational Therapy and Yoga

Occupational therapy is a client-centered health profession. Occupational therapists are concerned with promoting health and well being through the use of occupation. Occupational therapy brings purpose and meaning to everyday activities with heightened awareness of body's movements during activity participation while addressing mental clarity. This approach allows for a complete mind, body, and spiritual approach to participation in meaningful occupations. Yoga is more than basic stretching as it encompasses many components to the body's physical reactions; among those are emotional, spiritual, and mental well-being. Both practices have the potential to re-align the lost connection of mind, body, and spirit for positive outcomes.

Occupational therapists can learn and teach yoga techniques to clients provided they become competent in the teachings and the use of yoga techniques; learning yoga is something the client is interested in. Yoga as an intervention tool has been suggested to be used by healthcare professionals, including occupational therapists (Mailoo, 2005 & Chugh-Gupta et al., 2013). The OTPF states that occupational therapists need an "understanding of a client's perspective and background" and to "identify priorities and

desired targeted outcomes" leading to the clients engagement in occupation (AOTA, 2014, p. 61).

By including mindfulness practices into treatment sessions, there is an enhanced engagement in occupations for both clients and therapists (Olson, Skinner, Hill, Pietkiewicz, Mahaffey, & Cunix, 2007). This engagement allows clients to have awareness without judgment and therapists to analyze activities and skills. The awareness and insight permits clients to separate sensations from sensory or emotional responses enabling for engagement in meaningful activities. For example, for a client with chronic pain or a chronic disability, mindfulness can provide individuals insight and coping mechanisms needed to participate in their meaningful occupation. With the help of yoga techniques, therapists may be able to be fully present with their clients especially when the clients are at their most vulnerable state.

Stew (2011) recognizes that by teaching occupational therapy students methods of mindfulness, students will be given opportunities to develop mindfulness which can lead to improved self-awareness, compassion and empathy of self and others, decreasing client judgment, and enhancing the overall success of clinical interventions. Given that occupational therapy and the philosophical tenets and methods of mindfulness are compatible, improved patient care could occur (Thompson, 2009). Improved patient care could occur if students have developed the skills needed to understand themselves and others early in their education, and can then take those skills into their days as a practicing therapist.

Summary

Both stress and anxiety in college students have been studied for over 50 years, and students have reported an increase in these areas. Yet, university and college programs, and their accreditation standards, have not made the necessary changes to address these needs in curricula.

It appears that occupational therapy professional programs do not adequately prepare students to successfully manage their stress as students and as future practicing therapists. Academic programs recognize their curricula are demanding and occupational therapists understand the ever importance of a work-life balance. Yet there is still a disconnect of providing the students meaningful skills training in the management of the stressors that come with the occupation of being a student.

Stress management skills, favorable or unhealthy, will follow the student into their professional career. Rowe (2006) notes the importance that stress management skills and techniques be taught and implemented to reduce debilitating symptoms of stress; literature demonstrates yoga as being a helpful tool in the management and reduction of stress.

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Manuscript

Introduction

Yoga is a practice of being in the present, to relax, and to slow down. For over 5,000 years, yoga (practice) techniques have been used to achieve happiness in everyday life. One achieves this state by connecting the mind, body, and spirit; the literal definition of yoga is yoke or union (Prabhavananda & Isherwood, 1987). Yoga is the practice of finding ones truest self through the use of movement (asana), breath (pranayama), and relaxation techniques (dyhana) (Prabhayananda & Isherwood, 1987).

Stress is a public health concern, coined by the World Health Organization as the "Health Epidemic of the 21st Century" (Fink, 2016, p. 3). Stress affects many individuals both physically and psychologically (Sohail & Rehman, 2015). In 2015, 37% of women and 31% of men reported feeling stressed (American Psychological Association [APA], 2015). While acute stress might be beneficial in keeping a person active and alert, prolonged exposure to stress can have detrimental effects on one's physical and mental health (Arora & Bhattacharjee, 2008). Stress has been documented to lead to anxiety, depression, musculoskeletal disorders, immune suppression, chronic pain, high blood pressure, heart disease, and cognition deficits (Anderzén-Carlsson, Persson Lundholm, Kohn, & Westerdahl, 2014; Hagen & Nayar, 2014; & Kiecolt-Glaser, McGuire, Robles, & Glaser, 2002). Additionally, unhealthy behaviors like smoking, poor dietary, and sleep habits may be used as coping mechanisms for stress (Friedman, Sobel, Myers, Caudill, & Benson, 1995; Selye, 1956); all may lead to additional health risks.

In 2016, 86% of college students reported feeling "overwhelmed by all they had to do" within the previous 12 months (American College Health Association [ACHA],

2016, p. 13). The ACHA (2016) reported stress, anxiety, and depression to be among the top mental health concerns to negatively impact students success in the classroom. While all collegiate programs are challenging, students enrolled in an allied health program face additional demands outside the classroom (Stew, 2011). In addition to traditional lecture based courses, these students are also interacting with patients and developing and implementing documentation, all of which has been shown to be anxiety provoking. With the number of students reporting feeling stressed and/or anxious, the mental health of college students needs to be addressed.

Being a client-centered health profession, occupational therapy is concerned with promoting health and well being through the use of occupation. An *occupation* as defined by American Occupational Therapy Association (AOTA), is any daily life activity that is meaningful, valuable, or satisfying to an individual, group, or population (AOTA, 2011). Occupational therapists hold strong to the belief that occupational balance is needed for optimal daily functioning, health, and well-being. For the purpose of this research, the *occupation* targeted is that of being a student. If students are stressed or feeling anxious, occupational balance is not achieved therefore limiting or depleting the daily functioning, health, and well-being of that student. The roles, patterns, and routines of students are changed as professional curricula begins. Occupational therapy students are asked to apply abstract thinking using research, clinical reasoning skills, and have a greater emphasis on theory (Malek-Ismail & Krajnik, 2016). Research conducted on Master of Occupational Therapy (MOT) students by Pfeifer, Kranz, & Scoggin (2008, p. 226) found 67% rated their stress levels at 'above average' to 'highest in my life'. Additionally, an increase of stress was reported when students are asked to use clinical

reasoning skills, concepts, theory, and research (Malek-Ismail & Krajnik, 2016). While Malek-Ismail and Krajnik (2016) do not offer suggestions for improved stress management, they do recognize the importance of better understanding the perceptions of stress of MOT students perceive.

Recommendation for formal education of stress management techniques and the learning of healthy coping skills and strategies has been suggested for decades, yet only a few programs have started to implement small learning opportunities (Stew, 2011; Wolf & Kissling, 1984; Rowe, 2006). Allied health programs, like occupational therapy, find it challenging to add these teachings to their curricula due to the numerous standards in place by the Accreditation Council for Occupational Therapy Education (ACOTE) Standards (AOTA, 2011). The benefits of teaching allied health students stress management and coping techniques may help the student's academic career and their future lives as professional therapists (Stew, 2011).

The practice of yoga may help to benefit both mental and physical setbacks students might face. On the outer most physical layer, yoga helps to increase muscle strength while enhancing flexibility. Internally, yoga helps to reduce blood pressure and the heart rate by creating slower and deeper inhalations, which allows for an increase of oxygen consumption (Parshad, 2004). When practicing yoga, a shift from the flight-or-flight response of the sympathetic nervous system to a relaxation response of the parasympathetic nervous system occurs (McCall, 2007). Woodyard (2011) reported the relaxation response initiates a slower and deeper respiration rate, a slower heart rate, a decrease in blood pressure, lowers cortisol levels, and vital organs receive an increase of blood flow. Therefore, yoga creates a balance of energy and homeostasis in the body and

optimal sympathetic responses to stressful stimuli. In summary, practicing yoga can help to manage stress and stressful situations. By utilizing stress management skills through yoga, occupational therapy students may better manage their time, plan for assignments, and think critically and creatively in both academic and clinical settings with ease and joy.

Studies have shown allied health professionals have a faster burnout rate over other professions (Balogun, Titiloye, Balagun, Oyeyemi, & Katz,, 2002; Stew, 2011). To help reduce future burnout, stress management skills are recommended to be taught in professional programs (Rowe, 2006). A positive ripple effect ensues when students are taught stress management skills. The students learn how to cope when faced with stressful situation when in their role as a student, they are then able to apply these skills to their professional life stressful situations, and finally, they can teach these skills to their clients. Interventions that include yoga techniques have been suggested to be used to healthcare professionals, including occupational therapists due to the health benefits previously mentioned (Mailoo, 2005; Chugh-Gupta, Baldassarre, & Vrkljan, 2013). Stew (2011) reported that when occupational therapy are given the opportunity to learn mindfulness techniques, they have the opportunity for improved self-awareness, show compassion and empathy of self and others, decrease client judgment, and have an overall success of clinical interventions. The philosophical tenets of occupational therapy and the methods of yoga are compatible, students may find academic success and improved patient care could occur upon graduation (Thompson, 2009).

Stress management skills, either favorable or unhealthy are likely to follow college students into their professional careers. The study of stress and anxiety in college

students has been researched for over 50 years. Literature continues to demonstrate yoga as a favorable tool in the management and reduction of stress for college students and professionals alike (Rowe, 2006; Kauts & Sharma, 2009; Villate, 2015; Narasimha Reddy & Ammani, 2013; Riley, Park, Marks, & Braun, 2012; Nowak & Hale, 2012). The number of students reporting negative effects of stress continues to rise; however, not enough change has been implemented to adequately prepare students in better stress management. Occupational therapy academic programs recognize their demanding curricula while also understanding the importance of a work-life balance; yet, there is still a disconnect of providing the students meaningful skills training and management of the stressors that come with the occupation of being a student.

Research Questions

The purpose of this study is to evaluate the effects of participating in an 8-week yoga intervention program for seniors and first year professional entry level master's students in an Occupational Therapy program at a private comprehensive Liberal Arts college in the Northeast region of the United States. The following research questions were addressed. Following program completion:

1) Will students demonstrate a decrease in stress?
2) Will students be able to have a sense of resiliency (capacity to recovery quickly from difficulties) to address stressful life situations?
3) Will students be more likely to use yoga strategies as an intervention tool in their future OT practice?

Hypothesis

Taking into account the expectations placed on students as the semester progresses, it was assumed that stress levels among the experimental group would decrease despite of the fact that Wang and associates, (2014) reported students' stress levels increased with the progression of the semester. Therefore, the intent of the present study was to start the 8-week intervention and examine the students self reported stress levels through midterm examinations to Thanksgiving break.

Methods

Design and Procedure.

An unblinded, randomized-controlled pilot study design was used. Participants were randomly assigned to the experimental (i.e., yoga) or control (i.e., no-yoga) condition. Data was measured using standardized and non-standardized assessment tools followed by open-ended questions. The Institutional Review Board for Human Subjects Research (see Appendix i) approved the study.

A multi-pronged approach was used to recruit participants. Occupational Therapy seniors and first year graduate students of the same cohort were recruited via departmental e-mails, Facebook posts, research posters, and verbal presentation in occupational therapy classes with permission of course instructors. Students who were not enrolled as seniors or first year graduate students of the College's Occupational Therapy program in the fall of 2016 as well as students with pre-existing heart conditions (e.g., high blood pressure and/or heart disease) were excluded due to specific coursework requirements and scheduling. Feedback from previous students on departmental surveys recognize this semester in the curriculum as the most challenging. In addition, students'

grade point averages are often seen to be the lowest in their academic careers during this semester.

All participants were given an in-person pre-test packet which included a battery of psychological questionnaires. Informed consent was provided by all research participants. Throughout the following weeks, participants in the experimental group were advised to only participate in twice weekly 60-minute yoga classes with methods of mindfulness. In the control group, participants were asked to workout two hours each week, with the exception that they do not attend any yoga classes. At the end of each week, all participants were sent an e-mail with a link to an electronic Perceived Stress Scale (PSS), (Cohen & Williamson, 1988), adapted for weekly use over the suggested month duration. At the conclusion of the 8-week study, all participants were invited to complete a post-test questionnaire packet that included an open-ended questionnaire about their experiences in addition to the regularly administered measures. In efforts to hold the control group accountable of their workouts, participants were asked to supply a log of activity. Participants in the control group were issued a $10 gift card at the completion of the study.

Measurements.

The Perceived Stress Scale (PSS). The PSS (Cohen & Williamson, 1988) is a 10-item, self-report questionnaire (see Appendix ii). The questions addressed in this scale pertain to one's perceptions of stress and how one might respond to stressful situations. Participants rate each item on a 5-point scale, from *0* (Never) to *4* (Very Often). Validity of this measurement has been established by Cohen and Williamson (1988).

The total self-perceived stress score is calculated by finding the sum of the 10 items. However, scores for questions are #4, 5, 7, & 8 are reversed as pictured below. The PSS has a range of scores between 0 and 40. Scores ranging from 0 – 13 would be considered low stress, scores ranging from 14 – 26 are considered moderate stress, and scores ranging from 27 – 40 would be considered high perceived stress (Cohen & Williamson, 1988).

PSS Scoring:	Never	Almost Never	Sometimes	Fairly Often	Very Often
Questions 1, 2, 3, 6, 9, & 10	0	1	2	3	4
Questions 4, 5, 7, & 8	4	3	2	1	0

State-Trait Anxiety Inventory for Adults Form Y (STAI). The STAI (Spielberger, 1989) has 40-items on a 4-point scale from *0* (Not At All) to *4* (Very Much So). This tool is used to assess, diagnose, and separate state anxiety and trait anxiety, feelings of anxiety and feelings of depression (see Appendix iii). How one currently feels and how they usually feel. Higher scores indicate greater anxiety levels. There is significant evidence of construct and concurrent validity of the scale (Spielberger, 1989). The STAI scores were computed by adding each State and Trait item.

Of the various types of anxiety, State and Trait anxiety are often defined. State anxiety is the emotional state of an individual response to a particular situation or moment. Trait anxiety is the tendency of an individual to respond to stress with State anxiety (Moscaritolo, 2009; Turner & McCarthy, 2017).

Open-Ended Questionnaire Measure. Measures were created to obtain participant demographics at the start of the study and to gather information regarding the participants' perception of stress at the conclusion of the study (see Appendix iv). Having an open-ended questionnaire helped to enhance the researchers understanding of the participants' internal progress to the research, their experience, their meaning, their purposes, or other variables that are unable to be detected through standardized tests or quantitative measurements.

Data Analysis

All variables were checked for normality before further analyses were considered. The scores of the PSS and STAI instruments were aggregated and analyzed using Excel to estimate levels of stress and anxiety. Given the exploratory nature of the study and limited sample size, a non-hypothesis testing approach was chosen. Rather, the effects of yoga on each time point of the study were examined by calculating bias-corrected Hedges' g and represented in a forest plot.

Hedges' g.

Based on the small sample size of this study, the statistical measure, Hedges' g was used rather than a typical hypothesis test for PSS scores. Hedges' g is a measure of effect size and is typically used when sample sizes are smaller than 20 (Andele, 2016). The effect size explains the difference from one group to another. In this case, the effect size was determined between the experimental and control groups with a confidence interval of 95%. When using a sample to estimate populations, the confidence intervals provide a range of possible values based on the sample data (Lininger & Riemann, 2016). The Hedges' g formula used is:

$$\text{Hedges' } g = \frac{M_1 - M_2}{SD^*_{pooled}}$$

M1 – M2 = difference in means of the control and experimental groups and SD* = pooled and weighted standard deviation.

Forest Plot.

A forest plot is used as a visual representation of the Hedges' g analysis. In this study, each horizontal line represents each of the 8 weeks, plus the pre and post-test sessions. The vertical line represents a line of no effect, in that, there is no clear difference between the experimental and control groups. Results to the left of the vertical line indicate an outcome favoring the experimental group.

Results

Participant Demographics.

Of the potential 54-student cohort, 11 full-time students ranging in age between 21 to 27, volunteered for this study. The sample consisted of healthy college students who reported exercising regularly, do not abuse alcohol or smoke tobacco, and do not use medications for health concerns. Demographics are listed on Table 1.

Table 1. Participant Characteristics

Demographic Variables	Characteristics	Experimental Frequency	Percent (%)	Control Frequency	Percent (%)
Gender	(n=11)				

	Male	0	0.0%	1	9.1%
	Female	6	54.5%	4	36.4%
Program	(n=11)				
	Senior	5	45.5%	3	27.3%
	PEL	1	9.1%	2	18.2%
Age	(n=11)				
	20	1	9.1%	0	0.0%
	21	4	36.4%	2	18.2%
	22	1	9.1%	1	9.1%
	23	0	0.0%	1	9.1%
	27	0	0.0%	1	9.1%
Age Mean	21.82	21		22.8	
Age Std. Dev.	1.89	0.063		2.5	
Avg. Hours of Sleep	(n=11)				
	6-8hrs	3	27.3%	4	36.4%
	8-10hrs	3	27.3%	1	9.1%
GPA Satisfaction	(n=11)				
	OK	1	9.1%	0	0.0%
	Satisfied	2	18.2%	4	36.4%
	Very Satisfied	3	27.3%	1	9.1%

Workout Frequency	(n=11)				
	0-1 days/week	0	0.0%	1	9.1%
	1-3 days/week	2	18.2%	1	9.1%
	2-4 days/week	1	9.1%	2	18.2%
	3-6 days/week	2	18.2%	1	9.1%
	Everyday	1	9.1%	0	0.0%
Previous Yoga Experience	(n=11)				
	Yes	4	36.4%	2	18.2%
	No	2	18.2%	3	27.3%
Level of Financial Stress	(n=11)				
	Low Stress	3	27.3%	0	0.0%
	Moderate Stress	2	18.2%	5	45.5%
	High Stress	1	9.1%	0	0.0%

Perceived Stress Scale (PSS) Score Results.

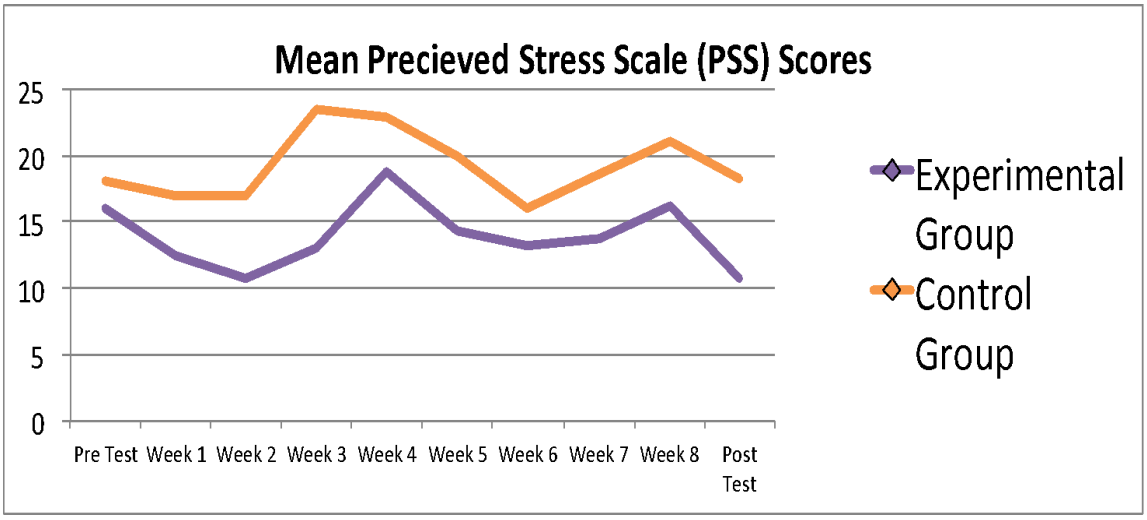
The PSS score means were calculated (Figure 1) each week. At every stage, the means of the experimental group were found, lower than the control group. This finding

may indicate a positive effect of yoga on perceived stress. However, due to the small sample size, this result should be interpreted with caution. Following the comparison of mean differences, effect sizes using Hedges' g were calculated and visually represented in a forest plot (Figure 2). The PSS statistical reporting are listed on Table 2.

Table 2. PSS Statistics

	Mean	SD	Hedges' g	Standard Error	Lower Limit	Upper Limit
Pre Test	16	6.54	-0.266	0.61	-1.434	0.948
Week 1	12.5	6.19	-0.818	0.58	-1.956	0.319
Week 2	10.8	3.4	-1.675	0.659	-2.966	-0.383
Week 3	13.1	5	-1.686	0.66	-2.979	-0.392
Week 4	18.8	7.3	-0.569	0.567	-1.679	0.542
Week 5	14.3	6.2	-0.927	0.588	-2.08	0.225
Week 6	13.2	8.6	-0.36	0.559	-1.455	0.736
Week 7	13.7	6.1	-0.916	0.587	-2.067	0.235
Week 8	16.3	9.6	-0.519	0.565	-1.625	0.588
Post Test	10.7	6.5	-1.234	0.613	-2.435	-0.032
Entire Study	13.94	6.54	-0.916	0.198	-1.304	-0.527

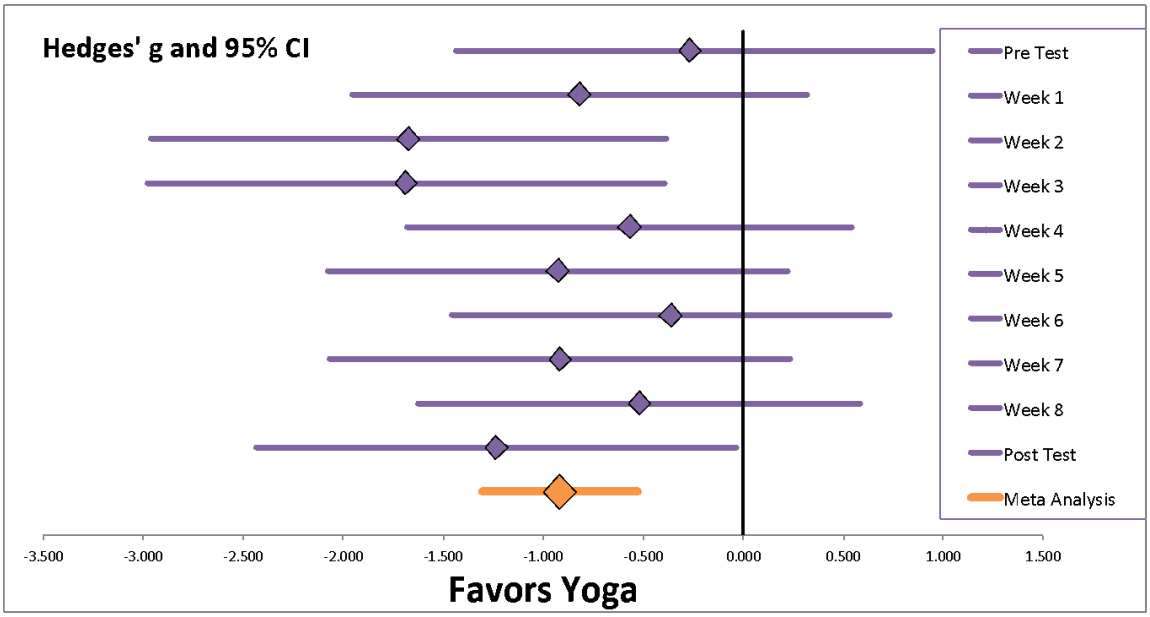
Figure 1:



The forest plot of effect sizes revealed that in week 2 and 3 of the semester the largest effects (-1.675 & -1.686) were observed. At these two time points, the 95% confidence intervals of the effect size did not cross 0. This result indicates an effect in favor of the yoga intervention. A similar result was found for the posttest with an effect size of -1.234. Yet, at that point, the upper confidence interval crossed 0 by a slight margin (0.032). For all other time points, effect sizes in favor of the intervention were observed.

The results of calculating a pooled effect size analysis of all the effect sizes, excluding pretest responses indicate the yoga intervention helps to reduce perceived stress.

Figure 2:



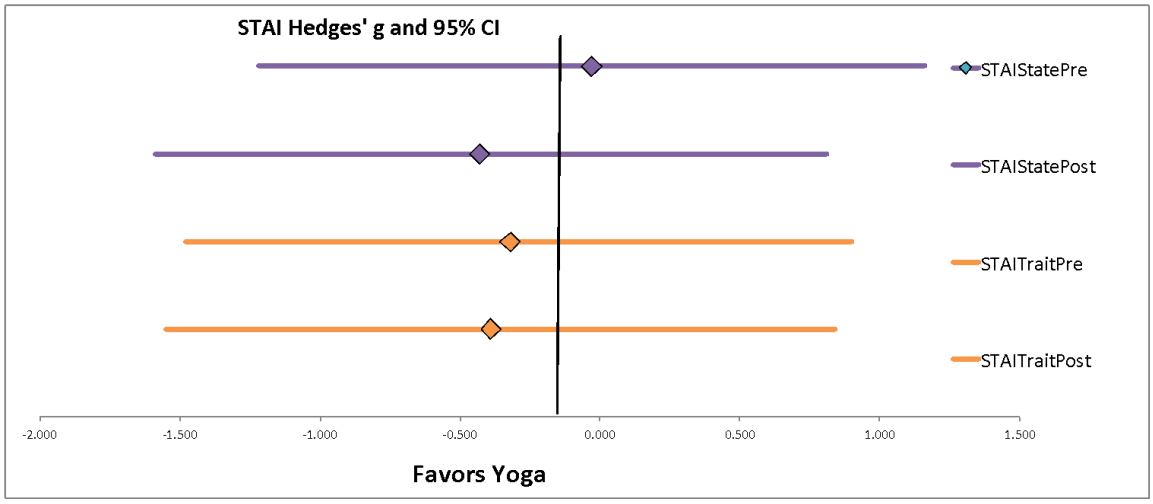
State Trait Anxiety Index (STAI) Score Results.

The effect sizes using Hedges' g were calculated and visually represented in a forest plot (Figure 3). At posttest data collection, the forest plot of effect sizes revealed both State and Trait anxiety levels decreased. The STAI statistical reporting are listed on Table 3.

Table 3: STAI Statistics

	Mean	SD	Hedges' g	Standard Error	Lower Limit	Upper Limit
STAIStatePre	39.7	18.3	-0.03	-0.03	-1.22	1.16
STAIStatePost	29.8	16.6	-0.43	-0.39	-1.59	0.81
STAITraitPre	38.8	18.9	-0.32	-0.29	-1.48	0.9
STAITraitPost	33.8	18.8	-0.39	-0.36	-1.55	0.84

Figure 3:



Experimental Group Responses To Open Ended Questions.

Participants in the experimental group responded to an open-ended questionnaire during posttest data collection. The researchers organized responses by similar responses and common themes. Both favorable and adverse responses were counted to identify commonalities in the feedback are described in Table 4.

The responses relating to participating in this study and the recognition of low stress levels align with the references in that, their stress has decreased because they participated in yoga on a regular basis for 8-weeks. In addition to stress reduction, participants reported improvements in their physical and mental health, healthier relationships with themselves and others, and developed better time management and organizational skills. Participants noted the time commitment each week of attending two 60-minutes classes seemed to be demanding as these sessions interfered with times the participants could be studying.

Participants mentioned they would like to continue and maintain a regular yoga and meditation practice. With that, participants noted taking yoga classes are expensive.

In addition, finding an instructor they like, at a time they can go to, is a big challenge as there are different yoga teaching styles. A few participants commented they will incorporate yoga as part of their workout routine.

When reflecting on their future positions as clinical occupational therapists, participants stated seeing themselves using breathing techniques learned in the study. They noted the benefit of using these techniques for not only their clients, but for themselves in stressful situations.

Table 4: Open-Ended Question Responses – Experimental Group

Mentions	Common Themes
18	**Stress Reduction** *"It was such a great stress reliever so I really think I felt better all around. I felt like I had a clearer mind and was able to focus easier."* *"I think my stress around school has actually been at a low for this semester. I think I have managed my time better and learned better ways to manage my stress through techniques used in yoga."*
10	**Less Judgmental with Self/Increased Self Trust** *"I have learned that I am very hard on myself and yoga has taught me how to be less judgmental and more joyful and accepting of my life and myself."* *"I felt more relaxed and willing to do tasks without being rushed or stressed. I also felt that I could do the work, I just needed to trust myself."*
9	**Increased Mental Clarity** *"This greatly impacted my mental health. It's been challenging this*

	semester moving to a place where I don't know anyone. Yoga helped me control my anxiety related to school work and moving to a new place." *"I was much more in tune with what I needed in order to maintain good mental health. Provided me with time for reflection."*
8	**Improved Relationship with Self and Others** *"I felt better connected to myself through my yoga experience. I felt that I was able to bond with some of my classmates through this experience. I would say yoga benefited my relationship to myself and others."* *"I learned a lot about myself through this process. I felt a real positive change, such as a decreased stress level, a healthier lifestyle, and more confidence in myself. I also appreciated the relationships I built throughout the weeks."*
7	**More Relaxed** *"I felt more relaxed from attending yoga twice a week. It forced me to take some self care time in the midst of studying all semester."* *"I felt more relaxed and more in control which helped m with my stress related to school."*
6	**Increased Cohort Connection** *"I enjoyed attending yoga twice a week. It was enjoyable to have yoga class with people from my cohort. It was relaxing and I looked forward to it each week."* *"I felt better connected to myself through my yoga experience. I felt that I was able to bond with some of my classmates through this experience. I*

would say yoga benefited my relationship to myself and others."

6 **Greater Awareness of Stressors**

"Yoga influenced my mental health by helping me become more aware of my body, what my body is saying to me, when I'm stressed and how I can manage my stresses."

"I think I am more mindful of how I can calm myself when I am feeling stressed. I also think I am more aware of what causes me stress so I can avoid the things that do, like leaving assignments to the last minute."

5 **Difficulty with the Time Commitment**

"Sometimes I felt that taking 2 hours out of my week was just another commitment that was required of me, but once I got to yoga, I always wanted to be there."

"The time commitment was a little much at times. It seemed like the time was always supposed to be doing something else or wanted to be studying."

5 **Increased Time Management**

"I had to prioritize and plan my time more accordingly to complete all my assignments."

"I had to manage my time better, which forced me to be more organized. I also was more relaxed during the week even when we had something stressful to do."

4 **Greater Focus**

"I was much more focused and it provided me with some good coping

	techniques to utilize before exams. It was also nice to have time to be active."
	"Everything. This really helped me focus on stuff and have a calming presence more often. I also enjoyed getting to know my classmates more."
4	**Enjoyed Practicing Yoga**
	"I loved participating in yoga! It was a lot of fun, I enjoyed it! I felt that I learned a lot-especially regarding my body and what I can do to relax and calm myself."
	"The yoga itself. It helped me relax at the end of long days. I really enjoy practicing yoga. It's a great stress reliever."

Control Group Responses To Open Ended Questions.

Participants in the control group were asked to reflect on their experience during the 8-week study. The major common theme mentioned was the benefit of checking in with themselves each week to fill out the PSS. This action allowed an opportunity to reflect on their feelings by recognizing their own stress levels and their management techniques. The inability to practice yoga was also mentioned by control group participants; noting, had they been able to practice yoga, they believe their stress levels would have been decreased.

Table 5: Open-Ended Question Responses - Control Group

Mentions	**Common Theme**

6	**Increased Awareness of Stress** *"Reflecting on the same questions each week helped me to see what areas I'm stressed in, and think about why and how to respond to it."* *"Filling out weekly stress surveys helped me be more mindful about how I was feeling/Wegman's gift card/added motivation to exercise."* *"Weekly surveys to check in/reflect on my feelings about the week."* *"Made me think about and reflect on my time management & stress."* *"Helped make me aware of how stressed I was by doing weekly check ins."* *"I noticed a trend in stress-always felt there were MANY things outside of my control, but I did usually feel competent about my abilities. I realized this through my responses to the survey."*

Discussion

This study investigated the effects yoga had on stress among the undergraduate and graduate student population at a small comprehensive liberal arts college in the Northeast region of the United States. Based on the current literature, the need was recognized for college campuses to offer and promote stress management techniques to include yoga, especially in allied health professional curricula.

The results of this study support the expected outcome. Occupational therapy students in the professional program, based on the majority of current literature on the practice of yoga, were found to have significantly lower stress and had an opportunity to reflect on how yoga can be used for stress management. While in a study by Wang and

associates, (2014), students' stress levels had increased with the progression of the semester. In this study, having started the 8-week intervention at the beginning of the semester, may have avoided the rush of final examinations and benefited the students.

The results of calculating a pooled effect size analysis of all the effect sizes, excluding pretest responses, indicates the yoga intervention helps to reduce perceived stress. Though both groups saw a rise in all of PSS scores throughout the study, the experimental group managed their stress more effectively when the anticipation of a stressful peak occurs and while decompressing from a stressful week; this was displayed in weeks 7 and 5 respectfully. Participants in the experimental group, during weeks 5, 6, and 7, were less variable with their perceived stress. While the posttest results do cross the vertical axis, a substantial gap between PSS scores was found and over an 8-week regular yoga practice, the effects of yoga, favored the management and reduction of stress. Potentially, with more participants, a greater significance of the positive effects yoga has at peak levels in the semester might result.

While the upper confidence intervals do cross 0, the decrease in effect size could indicate an effect in favor of the yoga intervention for the reduction of State and Trait anxiety.

This management and reduction of stress is particularly true in the second and third weeks of the study where the entire effect size is positioned to the left of the vertical line of no effect. This representation brings to attention the importance of a steady and regular yoga practice. By practicing regularly, yoga appears to lay the foundation of managing upcoming perceived stress as well as returning to a calmer state post stressful situations. In the second and third weeks of the study, when students attended classes

while preparing for exams and assignments, yoga had a positive effect on stress management moreover exercise alone.

The findings from this study indicate the usefulness of yoga as a foundational layer to help prevent the negative effects of stress. Therefore, yoga intervention may affect how students manage their stress levels leading up to exams, term papers, and practical competency based examinations. Occupational therapy programs should consider implementing yoga as a stress management tool with their students throughout their challenging curricula, and as a strategy tool to reduce future burnout and provide optimal patient care in their future practice

Limitations

The results of this study limit the generalizability to a greater population due to narrow recruitment of students in the senior or first year graduate class from the Occupational Therapy department. The yoga intervention was offered in convenience of the students fall course schedule to allow for optimal student participation. The sample size of this study was smaller than initially forecasted. The 20% response rate may be due to the fact the students invited to participate may have been overwhelmed by demanding academic obligations as noted in the collection of syllabi at the beginning of the semester. In addition, due to start of the semester and the time frame of the 8-week study, recruitment duration was short, possibly not giving the requested cohort enough time to adequately plan. The planned time frame of the study was to take into account when mid-term examinations would fall and to conclude the study before Thanksgiving break.

Outside influences, such as financial, family, or relationship issues may have had an impact on the students stress levels both favorably and adversely. The honor code was used with both the experimental and control groups, trusting they would adhere to the study expectations; for example that control group exercised two hours each week, with no follow up other than the log turned in at the completion of the study.

It was also assumed that, because students in this study were self-selected, they would be a highly motivated group who wanted to practice yoga with expectations to feel less stressed by the end of the 8-week sessions. In addition, students might have had yoga asana as part of what drives them, and their occupational performance in their habits and routines.

Future Research

Further research on this topic is necessary, to advance yoga as a role of meaningful occupation in the effects of stress reduction in the profession of occupational therapy in the future.

Recommendations for future research:

1) A larger sample size with a heterogeneous population of participants to include different cities and regions to allow for a diverse sample.
2) Data be collected on physiological stress measures; an interprofessional study could enhance this aspect.
3) The use of standardized measures, especially a quality of life scale, pre/posttest demographics, and questionnaires.

Conclusion

The purpose of this study was to examine whether a small sample of occupational therapy students would report a reduction in stress when practicing yoga. The results of this study align with previous research in that yoga has a positive impact in reducing stress levels. The practice of occupational therapy addresses the importance of occupational balance and all occupations in daily habits and routines. However, rigorous occupational therapy program curricula create difficulties in student occupational balance management. Therefore, academic curricula should consider implementing improved and prolonged teachings of stress management trainings that include meditation, breathing techniques, and yoga. Not only would students notice a decrease in stress during their academic career, they would also have the tools for greater self-care as they enter the professional field to reduce the risk for burnout, and provide optimal patient care as a practicing occupational therapist.

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Appendix i: IRB

INSTITUTIONAL REVIEW BOARD FOR HUMAN SUBJECTS RESEARCH
PROPOSAL

1. General Information:

a. Funding:
   The Ithaca College Occupational Therapy department currently has access to all required equipment to complete this study. The Occupational Therapy department will fund pizza and incentives.
b. There is no external funding for this study.
c. Location:

Sessions will take place at the Ithaca College, Robert R. Colbert Sr. Wellness Clinic.

d. Time Period:

August 2016-August 2017

e. Expected Outcomes:

The outcomes of this study will culminate in presentation at the Occupational Therapy Research Colloquium, with hope to present results at regional and national conferences, and publish a manuscript in appropriate scholarly journals. Participants and other interested members of the community will be notified of presentation dates and invited to attend.

2. Related Experience of Researchers

BrieLynn Sturm: I am a Graduate student. I have had the following classes that provide experience related to research, occupational therapy, and yoga: research methods, research seminar, anatomy and physiology, kinesiology, occupational therapy theory, statistics, and group process. I am also a certified yoga instructor at the 200 RYT level since 2013. In addition, I am also trained in CPR/First Aid as well as CITI trained.

Mindy Cozzolino: Dr. Cozzolino, Associate Professor and Graduate Chair in the Department of Occupational Therapy, is the current Chair of Ithaca College's IRB board. She is CITI trained. She has completed numerous IRB approved studies and has disseminated their results both nationally and internationally.

3. Benefits of the Study:

Investigative team believes there is a potential for students who participate in this study to experience decreased anxiety, stress, and enhanced quality of life. The researchers will benefit through gathering evidence to support or negate a mindfulness program. Researchers may also disseminate results in at regional and national conferences, and publish a manuscript in appropriate scholarly journals.

4. Description of Participants

a. Number of participants: 30 Ithaca College Occupational Therapy students in experimental group, 30 Ithaca College Occupational Therapy students in control group

b. Salient Characteristics: Students (Seniors and/or First Year Professional Entry Level Students (PELS) 18 years of age or older, of the Ithaca College Occupational Therapy program. Students with physical delays will be given pose modifications. Subjects will be excluded if they have a preexisting heart and/ or respiratory conditions that may interfere with breathing techniques.

5. Description of Participation

The first meeting will take approximately 30-45 minutes where all participants (experimental and control) will be administered standardized assessments and a self-designed demographic questionnaire. Following completion of pretests subjects will be randomly assigned to either the experimental or control group. Students will be assigned by number pull.

Following the pre-test data collection, the control group will be given a log sheet to track their physical activity each week. Students agree to participate in at least 2 hours of activity each week, with the exception of attending any yoga classes on campus or within the community.

Following the pre-test data collection, the experimental group will participate in a prescribed yoga regimen developed and implemented by the primary investigator. The yoga program will meet twice weekly for 60-minute yoga sessions to include asana (movement/poses), pranayama (breath work), and meditation for 8 weeks. Attendance will be taken by instructor.

Both the control and experimental groups will be asked to complete a 10-question stress scale weekly (5 minutes) via dropbox.

Succeeding the 8-week intervention, collection of post standardization will occur with both the control and experimental groups. (Pizza will be provided at pre and post-test meeting.)

Total time for the both group participants will be between 17-18 hours. (16 hours of yoga intervention or physical activity, 1-2 hours for standardized assessments.)

6. Ethical Issues:

a) Risks of Participation:

The risks in this study are minimal, this study involves physical movement that, though unlikely, if done incorrectly, could result in injury. Additionally, the practice of yoga may awaken locked emotions, if this were to happen; information would be given to the counseling services on campus. If someone is injured, Instructor will refer them to the Ithaca College Health Center. Primary investigator is 200-RYT certified yoga teacher and CPR/FirstAid certified.

b) Have you attached an Informed Consent Form or Tear-Off Cover Sheet for anonymous surveys?

Yes. See attachments.

7. Recruitment:

a) Procedures

a. See attached emails, flyers, and statements read in classrooms. Participants will be recruited from the Ithaca College Occupational Therapy department via an e-mail sent to students in the senior class and first year professional entry level (PELS) graduate class during the first week of class, with a follow up email three days later. The e-mail will include an attached flyer providing information about the study. The same flyer will be posted in the halls and Occupational Therapy classrooms of CHS. Primary investigator will request permission of professors of these students to recruit in their classroom.

b) Inducement to Participate/Extra Credit

Outside the potential benefits of participating in a mindfulness program, no extra credit is given. Commencing the pre and post-test data, pizza will be provided. At post-test data completion, students in the control group will each receive a $10 gift card to on campus coffee cart dining services to compensate for their agreement of not participating in yoga for the 8-week study in addition to their agreement of weekly participation of online surveys. Participants in the control group who withdraw early from the study will not receive gift card.

8. Confidentiality/Anonymity:

This study is not anonymous. To expunge the data of any identifying information, all data will be randomly number coded and entered as such into the computer for subsequent analysis. Informed consent forms, screening forms and files will be retained in a locked office that is accessible only to the investigative team via their Ithaca College password protected computer. All data will be retained for a minimum of 3 years.

9. Debriefing:

N/A due to no deception; however, participants will be invited to attend the occupational therapy graduate research colloquium, where results will be presented.

10. Compensatory Follow-up:

In case of physical or psychological harm which might result from the subjects' participation, student's will be informed and directed to Ithaca College CAPs or Health Center for compensatory treatment or follow-up counseling.

Proposed Date of Implementation:

August 2016-August 2017

Signature of Principal Investigator:
BrieLynn Sturm, OTS

_____

Electronically submitted protocols must be sent from an Ithaca College e-mail account. Original signatures are not required. Ithaca College e-mail IDs have been deemed by the College to constitute a legal signature.

PLEASE NOTE THAT YOUR PROPOSAL WILL BE DEEMED INCOMPLETE UNLESS COPIES OF ALL INSTRUMENTS TO BE USED (SURVEYS, ETC.) AND INFORMED CONSENT FORM (IF NECESSARY) ARE SENT TO irb@ithaca.edu.

ITHACA COLLEGE
Sponsored Research

August 24, 2016

BrieLynn Sturm, Graduate Student
Department of Occupational Therapy
School of Health Sciences and Human Performance

Re: IRB 0516-05, Occupational Therapy and Yoga: A Study to Determine Usefulness for Occupational Therapy Students

Thank you for responding to the stipulations made on May 16, 2016 by the Institutional Review Board for Human Subjects Research (IRB). You are authorized to begin your project. This approval is issued under the Ithaca College's OHRP Federal-wide Assurance #00004870 and will remain in effect for a period of one year from the date of authorization.

Please add the IRB approval number (IRB 0516-05) to ALL recruitment and consent materials.

After you have finished the project (when data collection is complete and there is no further risk to human subjects), please complete the *Notice-of-Completion Form* found on the Sponsored Research website. Please note that review/approval of future proposals is contingent upon submission of this form.

Should you wish to continue the approved project beyond the expiration date, you may request an extension by sending an email to irb@ithaca.edu before August 23, 2017. *If the project expires, you must complete a new application for expedited review.*

Please note that if there are any adverse events resulting from this research, they must be reported to the IRB at irb@ithaca.edu.

Sincerely,

Wade Pickren, PhD
Director, Sponsored Research
Institutional Review Board for Human Subjects Research

/mat

c: Melinda Cozzolino Associate Professor/Graduate Chair

Appendix ii: PSS Scale

Perceived Stress Scale

The questions in this scale ask you about your feelings and thoughts **during the last week** . In each case, you will be asked to indicate by circling *how often* you felt or thought a certain way.

Name _____ Date _____

Age _____ Gender (*Circle*): **M F** Other _____

0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

1. In the last month, how often have you been upset because of something that happened unexpectedly?	0	1	2	3	4
2. In the last month, how often have you felt that you were unable to control the important things in your life?	0	1	2	3	4
3. In the last month, how often have you felt nervous and "stressed"?	0	1	2	3	4
4. In the last month, how often have you felt confident about your ability to handle your personal problems?	0	1	2	3	4
5. In the last month, how often have you felt that things were going your way?	0	1	2	3	4
6. In the last month, how often have you found that you could not cope with all the things that you had to do?	0	1	2	3	4
7. In the last month, how often have you been able to control irritations in your life?	0	1	2	3	4
8. In the last month, how often have you felt that you were on top of things?	0	1	2	3	4
9. In the last month, how often have you been angered because of things that were outside of your control?	0	1	2	3	4
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	0	1	2	3	4

Please feel free to use the *Perceived Stress Scale* for your research.

Mind Garden, Inc.
info@mindgarden.com
www.mindgarden.com

References

The PSS Scale is reprinted with permission of the American Sociological Association, from Cohen, S., Kamarck, T., and Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*, 386-396.

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Appendix iii: STAI

SELF-EVALUATION QUESTIONNAIRE STAI Form Y-1

Please provide the following information:

Name_____Date_____S_____

Age_____ Gender (*Circle*) **M** **F** T_____

DIRECTIONS:

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you feel *right* now, that is, *at this moment*. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

	NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO
1. I feel calm	1	2	3	4
2. I feel secure	1	2	3	4
3. I am tense	1	2	3	4
4. I feel strained	1	2	3	4
5. I feel at ease	1	2	3	4
6. I feel upset	1	2	3	4
7. I am presently worrying over possible misfortunes	1	2	3	4
8. I feel satisfied	1	2	3	4
9. I feel frightened	1	2	3	4
10. I feel comfortable	1	2	3	4
11. I feel self-confident	1	2	3	4
12. I feel nervous	1	2	3	4
13. I am jittery	1	2	3	4
14. I feel indecisive	1	2	3	4
15. I am relaxed	1	2	3	4
16. I feel content	1	2	3	4
17. I am worried	1	2	3	4
18. I feel confused	1	2	3	4
19. I feel steady	1	2	3	4
20. I feel pleasant	1	2	3	4

SELF-EVALUATION QUESTIONNAIRE

STAI Form Y-2

Name_____ Date_____

DIRECTIONS

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you *generally* feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

	ALMOST NEVER	SOMETIMES	OFTEN	ALMOST ALWAYS
21. I feel pleasant	1	2	3	4
22. I feel nervous and restless	1	2	3	4
23. I feel satisfied with myself	1	2	3	4
24. I wish I could be as happy as others seem to be	1	2	3	4
25. I feel like a failure	1	2	3	4
26. I feel rested	1	2	3	4
27. I am "calm, cool, and collected"	1	2	3	4
28. I feel that difficulties are piling up so that I cannot overcome them	1	2	3	4
29. I worry too much over something that really doesn't matter	1	2	3	4
30. I am happy	1	2	3	4
31. I have disturbing thoughts	1	2	3	4
32. I lack self-confidence	1	2	3	4
33. I feel secure	1	2	3	4
34. I make decisions easily	1	2	3	4
35. I feel inadequate	1	2	3	4
36. I am content	1	2	3	4
37. Some unimportant thought runs through my mind and bothers me	1	2	3	4
38. I take disappointments so keenly that I can't put them out of my mind	1	2	3	4
39. I am a steady person	1	2	3	4
40. I get in a state of tension or turmoil as I think over my recent concerns and interests	1	2	3	4

Appendix iv: Open-ended Questionnaires

PreTest:

Purpose of study: Seniors and first year Professional Entry Level Masters Students (PELs) of the Ithaca College Occupational Therapy (ICOT) program face high academic demands and have reported decreased quality of life due to changes in their habits and routines creating an increase of stress and anxiety. Proposal of participation in a twice-weekly intervention of yoga, meditation, and mindfulness techniques might reduce stress, lessening their chance of anxiety or depression and increase their quality of life.

Your participation is voluntary. You may refuse to answer any question or discontinue participation at any point. Please do not put any identifying information on this form. Please only complete this if you are 18 years or older. If you have any questions related to the study or this questionnaire, please send an email to **bsturm@ithaca.edu or Dr. Melinda Cozzolino at mcozzoli@ithaca.edu**

Age: _____

Gender you identify with:

Male	Female	Other
☐	☐	☐

Please list extra curricular activities you're involved with:

_____

_____

_____

Living Situation:

Alone	With Roommates	With Family
☐	☐	☐

On average, how many hours of sleep do you get each night?

Under 4	4-6	6-8	8-10	10+
☐	☐	☐	☐	☐

Please rate how satisfied you are with your Ithaca College GPA:

Very Satisfied	Satisfied	OK	Dissatisfied	Very Dissatisfied
☐	☐	☐	☐	☐

How often do you workout each week?

Never	0-1	1-3	2-4	3-6	Everyday
☐	☐	☐	☐	☐	☐

Have you practiced yoga before?

Yes	No
☐	☐

Level of financial stress you identify with:

No Stress	Low Stress	Moderate Stress	High Stress
☐	☐	☐	☐

Please explain your diet and if there have been any recent changes:

_____

_____

_____

Please explain any pre-existing health conditions:

_____

_____

_____

Please explain any additional information you think we need to know:

_____

_____

_____

Control Group: Open Ended Questionnaire Post Test

1. What did you enjoy about participating in this study?

2. Was there anything you did not enjoy about participating this study?
   If so, explain:

3. How did participating in this study impact your school based occupations?

4. How did participating in this study impact your stress as it related to school?

5. How did participating in this 8-week study effect your relationship to yourself and/or to others?

6. How did participating in this 8-week study influence your physical health?

7. How did participating in this 8-week study influence your mental health?

8. What have you learned about yourself over the 8-week study?

9. What is the likelihood you will maintain physically active lifestyle?

10. What types of tools mentioned in this study, can you see yourself using as a future Occupational Therapist?

11. Please circle the number that corresponds with how you would rate your experience:

1-Very Satisfied 2- Satisfied 3-Neutral 4-Unsatisfied 5- Very Unsatisfied

Experimental Group: Open Ended Questionnaire Post Test

1. What did you enjoy about participating in this study?

2. Was there anything you did not enjoy about participating this study?
    a. If so, explain:

3. How did participating in this study impact your school based occupations?

4. How did participating in this study impact your stress as it related to school?

5. How did participating in this 8-week yoga study effect your relationship to yourself and/or to others?

6. How did participating in this 8-week yoga study influence your physical health?

7. How did participating in this 8-week yoga study influence your mental health?

8. What have you learned about yourself over the 8-week yoga study?

9. What is the likelihood you will maintain a yoga/meditation practice?

10. What types of tools mentioned in this study, can you see yourself using as a future Occupational Therapist?

11. Please circle the number that corresponds with how you would rate your experience:

1-Very Satisfied 2- Satisfied 3-Neutral 4-Unsatisfied 5- Very Unsatisfied

Appendix v: Sample Yoga Intervention

Sample Yoga Class

Integration:
- Child's Pose
- Cat/Cow
- Downward Facing Dog
- Forward Fold

Sun Salutations – 3x

Crescent Lunge
- Crescent Lunge Twist
- Warrior 2
- Reverse Warrior
- Extended Side Angle
- Side Plank
  - Connecting Vinyasa

Chair Pose
- Chair Twist
- Forward Fold/Gorilla/Malasana Squat/Crow Pose
  - Connecting Vinyasa

Warrior 1
- Warrior 2
- Triangle
- Straddle Fold/Goddess Pose/Skandasana
- Pyramid
  - Connecting Vinyasa

Back Bending Series
- Bridge/Wheel/Camel
- Supta Baddha Konsana

Half Pigeon
- Double Pigeon

Finishing Poses
- Happy Baby
- Supine Twist

Savasana

Closing Meditation